

Cluster in the Auroral Acceleration Region

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Due to a fortuitous evolution of the Cluster orbit, the Cluster spacecraft penetrated for the first time in its mission the heart of Earth's auroral acceleration region (AAR) in December 2009 and January 2010. During this time a special AAR campaign was carried out by the various Cluster instrument teams with special support from ESA and NASA facilities. We present some of the first multi-spacecraft observations of the waves, particles and fields made during that campaign. The Cluster spacecraft configuration during these AAR passages was such that it allowed us to explore the differences in the signatures of waves, particles, and fields on the various spacecraft in ways not possible with single spacecraft. For example, one spacecraft was more poleward than the other three (C2), one was at higher altitude (C1), and one of them (C3) followed another (C4) through the AAR on approximately the same track but delayed by three minutes. Their separations were generally on the order of a few thousand km or less and occasionally two of them were lying along the same magnetic field line. We will show some of the first analyses of the data obtained during the AAR campaign, where upward and downward current regions, and the waves specifically associated with those regions, as well as the auroral cavities, were observed similarly and differently on the various spacecraft, helping us to explore the spatial, as well as the temporal, aspects of processes occurring in the AAR.